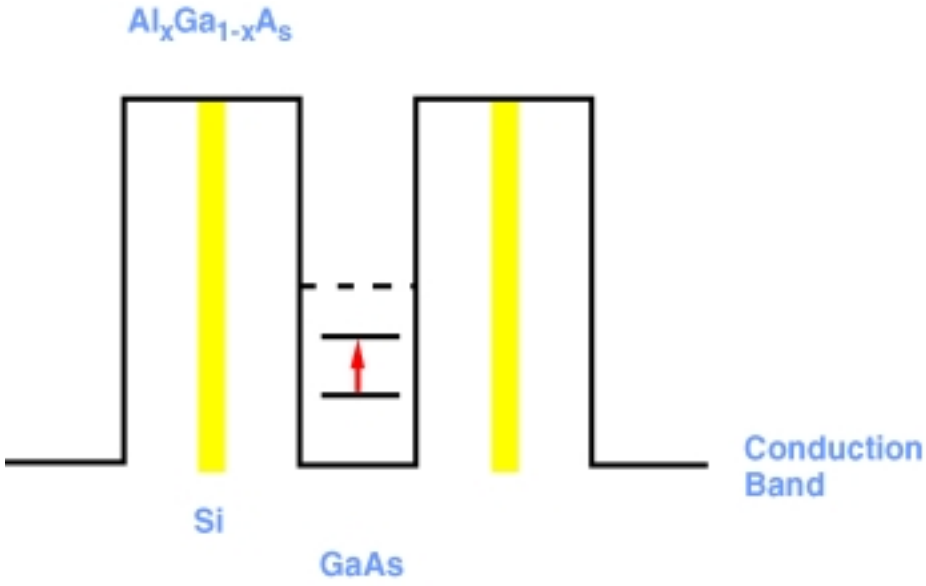
HETEROSTRUCTURE DEVICE USEABLE AS A FAR INFRARED PHOTODETECTOR



The device consists of at least two barrier layers (e.g., $Al_xGa_{1-x}As$) doped with impurities (e.g., Si) that provide charge carriers. The charges are trapped at low temperatures in the quantum well layer (e.g., GaAs) disposed between the two barrier layers.

Advantages include:

- Detection of radiation with wavelengths from millimeter to the far-infrared available with suitable choice of design parameters (layer thicknesses, alloy composition, etc.)
- Frequency fine-tuning achievable by application of an electric or magnetic field
- Signal strength controlled by concentration of impurity dopant.

Potential applications include:

- Sensitive detection of radiation in the millimeter and sub-millimeter regions of the electromagnetic spectrum
- Use in a space environment (temperature near absolute zero) for detection of long-wavelength ($\lambda \sim 1$ mm).

This semiconductor heterostructure can be continuously tuned. The device permits radiation to be detected from the infrared spectral region to the submillimeter wavelength range.

Patent licenses are available to companies with commercial interests.

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